



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Serial No.: 10/021,097
Filed: 12/12/01
Applicant: Ghamaty, et al.
For: Thermoelectric Device with Si/SiC Superlattice N-Legs

Examiner: Soward, Ida M
Group Art: 2822

Response of Final Office Action

Commissioner of Patents and Trademarks
Washington, DC 20231

Sir:

This letter is in response to Office Action mailed 3/31/03.

REMARKS

All of the claims were rejected under Section 103(a) as being unpatentable over Elsner in view of Ghamaty. Applicant requests reconsideration.

The combination of the teachings of the three cited prior-art patents does not suggest the present invention. As explained in Applicants' response filed January 7, 2003, the present application claims a thermoelectric module comprised of n-legs with at least 100 very thin alternating layers of silicon and silicon carbide. Applicants have shown with actual test data performance improvements of almost 300 percent over prior art efficiencies (14% as compared to 5%) with projected efficiency improvements of 600 percent (30% as compared to 5%). Nothing in the prior art suggests the use of thin layers of Si and SiC for the n-legs of thermoelectric modules. There is nothing in the prior art to suggest the combination of the Hilton teachings with the teachings of Elsner and Ghamaty. Furthermore, if the combination were made it would not work. The combination would not produce a workable thermoelectric module. The Hilton device is an avalanche photodiode. Photodiode technology is completely different from thermoelectric technology. Most importantly Hilton teaches that the current flow is perpendicular to the planes of the Si and SiC layers (see FIG. 1 of Hilton). In the present invention the current flow must be parallel to the planes of the Si and SiC layers (see FIG. 4C of the present application). Thus, clearly there is no suggestion in these prior art patents to combine their teachings and clearly any such combination would not produce the present invention.

Conclusion

The combination suggested by the Examiner is not suggested anywhere in the prior art and if the combination were made, it would not work as a thermoelectric device. For the reasons given above Applicants submit that the present invention as claimed is a very important advancement in thermoelectric technology amounting to tremendous improvements in efficiencies which are not disclosed or suggested by the cited prior art or to the best of Applicants knowledge, any other prior art. Therefore Applicants respectfully request that the outstanding claims be allowed and the application be allowed to issue as a patent.

Respectfully submitted,

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|--|--------------------------|-------------------------|
| AMENDMENT TRANSMITTAL LETTER (Small Entity) | | Docket No. |
| Applicant(s): | Serial No. 10/021,092 | Filing Date 12/12/11 |
| | | Examiner SOWARD, IDA |
| | | Group Art Unit 2822 |

Invention: *thermoelectric device with Si/SiC superlattice N-Zn*

TO THE ASSISTANT COMMISSIONER FOR PATENTS:

Transmitted herewith is an amendment in the above-identified application.

- ☐ Small Entity status of this application has been established under 37 CFR 1.27 by a verified statement previously submitted.
- ☐ A verified statement to establish Small Entity status under 37 FR 1.27 is enclosed.

The fee has been calculated and is transmitted as shown below.

CLAIMS AS AMENDED

| | CLAIMS REMAINING AFTER AMENDMENT | HIGHEST # PREV. PAID FOR | NUMBER EXTRA CLAIMS PRESENT | RATE | ADDITIONAL FEE |
|--|-------------------------------------|-----------------------------|--------------------------------|---------|-------------------|
| TOTAL CLAIMS | - | = | 0 x | \$9.00 | \$0.00 |
| INDEP. CLAIMS | - | = | 0 x | \$42.00 | \$0.00 |
| Multiple Dependent Claims (check if applicable) <input type="checkbox"/> | | | | | \$0.00 |
| TOTAL ADDITIONAL FEE FOR THIS AMENDMENT | | | | | \$0.00 |

- ☒ No additional fee is required for amendment.
- ☐ Please charge Deposit Account No. _____ in the amount of _____
A duplicate copy of this sheet is enclosed.
- ☐ A check in the amount of _____ to cover the filing fee is enclosed.
- ☐ The Commissioner is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. _____
A duplicate copy of this sheet is enclosed.
 - ☐ Any additional filing fees required under 37 C.F.R. 1.16.
 - ☐ Any patent application processing fees under 37 CFR 1.17.

[Signature]
Signature

Dated: _____

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I certify that this document and fee is being deposited on 6/30/13 with the U.S. Postal Service as first class mail under 37 C.F.R. 1.8 and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

[Signature]
Signature of Person Mailing Correspondence

JOHN R. ROSS

Typed or Printed Name of Person Mailing Correspondence

cc: